



Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

West Fork Medicine Creek

Water Body Segment at a Glance:

Counties:	Mercer/Grundy
Nearby City:	Galt
Length of impaired segment:	40 miles
Pollutant 1:	Unknown
Source:	Unknown
Pollutant 2:	Bacteria
Source:	Rural Nonpoint Sources
Water Body ID:	0623



Scheduled for TMDL development: 2012 for “unknown”; 2013 for “bacteria”

Description of the Problem

Designated beneficial uses of West Fork Medicine Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health (Fish Consumption)
- Whole Body Contact Recreation – Category B

Uses that are impaired

- Protection of Warm Water Aquatic Life
- Whole Body Contact Recreation – Category B

Standards that apply

- Missouri’s Water Quality Standards at 10 CSR 20-7.031(4)(C) state that the *E.coli* bacteria count shall not exceed 126 colonies per 100 milliliters of water (126 col/100 mL) for Category A and 206 col/100 mL for Category B. This count is the geometric mean during the recreational season (April 1- October 31) in waters designated for whole body contact recreation.
- West Fork Medicine Creek is also impaired by other unknown pollutants. Because the pollutants are unknown, specific criteria cannot be cited. However, all Missouri streams are protected by the general criteria found in 10 CSR 20-7.031 (3). The general criteria that could apply to West Fork Medicine Creek state:

- (A) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
- (C) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
- (G) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.

Background information and water quality data

West Fork Medicine Creek is a rural stream that flows south through Mercer and Grundy counties before joining Medicine Creek in Grundy County. Medicine Creek is a tributary to the Grand River. The U.S. Environmental Protection Agency established a TMDL for this creek (called Little Medicine Creek at that time) in October 2006 for sediment. West Fork Medicine Creek is designated as Category B for the whole body contact recreation use, which means it has places deep enough for total immersion (i.e., swimming), but they may be on private lands or inaccessible to the public.

Excessive amounts of fecal bacteria in surface water used for recreation are an indication of an increased risk of pathogen-induced illness to humans. Infections due to pathogen-contaminated waters include gastrointestinal, respiratory, eye, ear, nose, throat and skin diseases. Like fecal coliform, *Escherichia coli*, or *E. coli*, are bacteria found in the intestines of warm blooded animals and used as indicators of the risk of waterborne disease from pathogenic (disease causing) bacteria or viruses. Most *E. coli* strains are harmless, but some can cause serious illness in humans and are occasionally responsible for product recalls. The harmless strains are part of the normal flora of the intestines, and can benefit their hosts by preventing the establishment of pathogenic bacteria within the intestine^{1,2}. Missouri's bacteria criteria are based on specific levels of risk of acute gastrointestinal illness. The levels of risk correlating to these criteria are no more than eight illnesses per 1,000 swimmers in fresh water.

Data used in determining the bacteria impairment was collected by the U.S. Geological Survey from 2002-2008. The geometric mean of five or more samples gathered during the recreational season exceeded the criteria of 206 col/100 mL for Category B in each of those years (Figure 1).

People can protect themselves from waterborne illness by avoiding contact with contaminated water. However, when swimming anywhere, it is wise to take commonsense precautions. These include washing hands before eating, showering after swimming and avoiding exposure to questionable water if you have open cuts or wounds.

¹ Hudault S, Guignot J, Servin AL (July 2001). "*Escherichia coli* strains colonising the gastrointestinal tract protect germfree mice against *Salmonella typhimurium* infection". *Gut* **49** (1): 47–55

² Reid G, Howard J, Gan BS (September 2001). "Can bacterial interference prevent infection?". *Trends Microbiol.* **9** (9): 424–8.

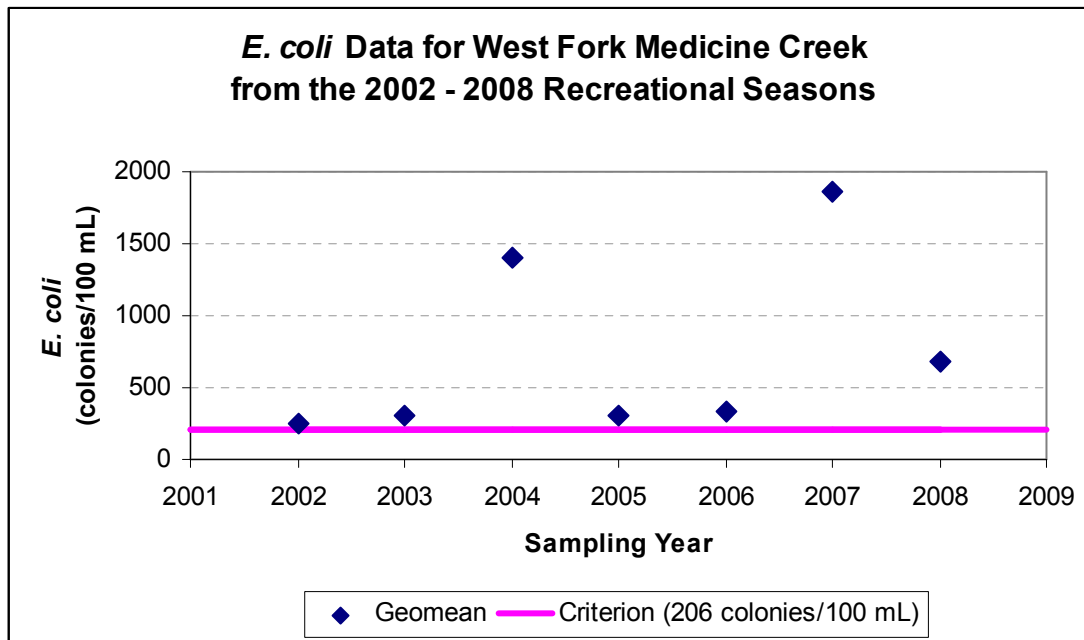


Figure 1

West Fork Medicine Creek is also listed for unknown pollutants. The creek was first documented as impaired during the department's Visual/Benthic Low Flow Survey on July 17, 2000. Evidence of impairment was primarily narrative rather than numeric, indicated by the presence significant channelization, sedimentation and reduced diversity of stream invertebrates (insect larvae, crayfish, leeches, etc).

The department then conducted two bioassessment studies on this creek, one in 2003-04 and one in 2006-07. Biological data are rated according to the Missouri Stream Condition Index, or MSCI. The MSCI must be 16 or higher for a stream to be considered protective of aquatic life. The biological data in the bioassessment studies show that the creek has an impaired invertebrate community in the upper one-half (20 miles) of the creek (Figure 2, next page). Though the source(s) is unknown, the data suggest "organic loading" (excess nutrients) and low flows contribute to the problems.

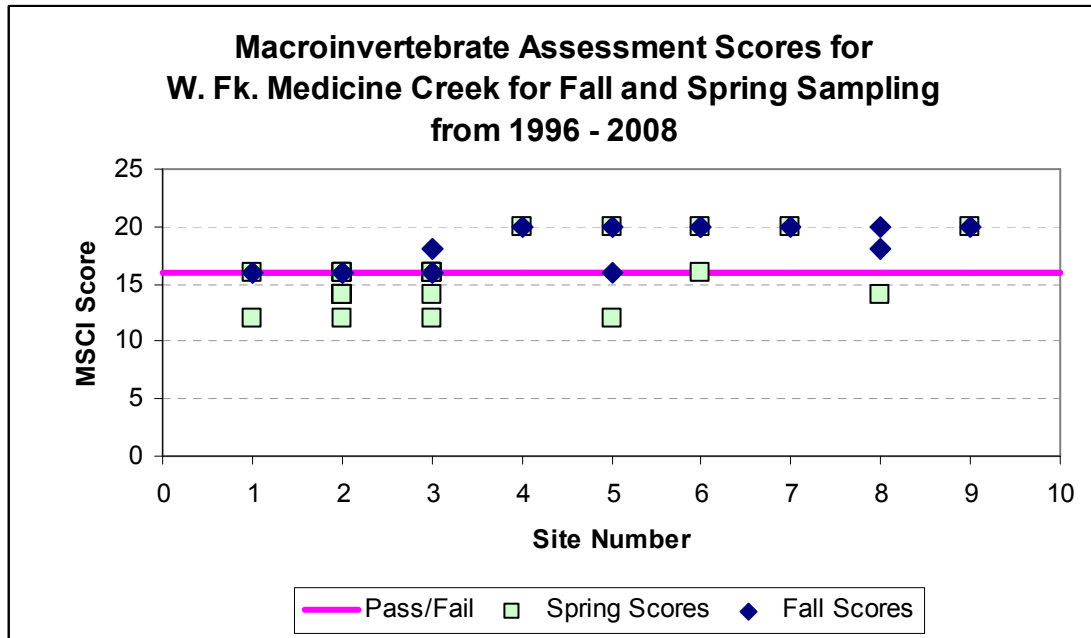
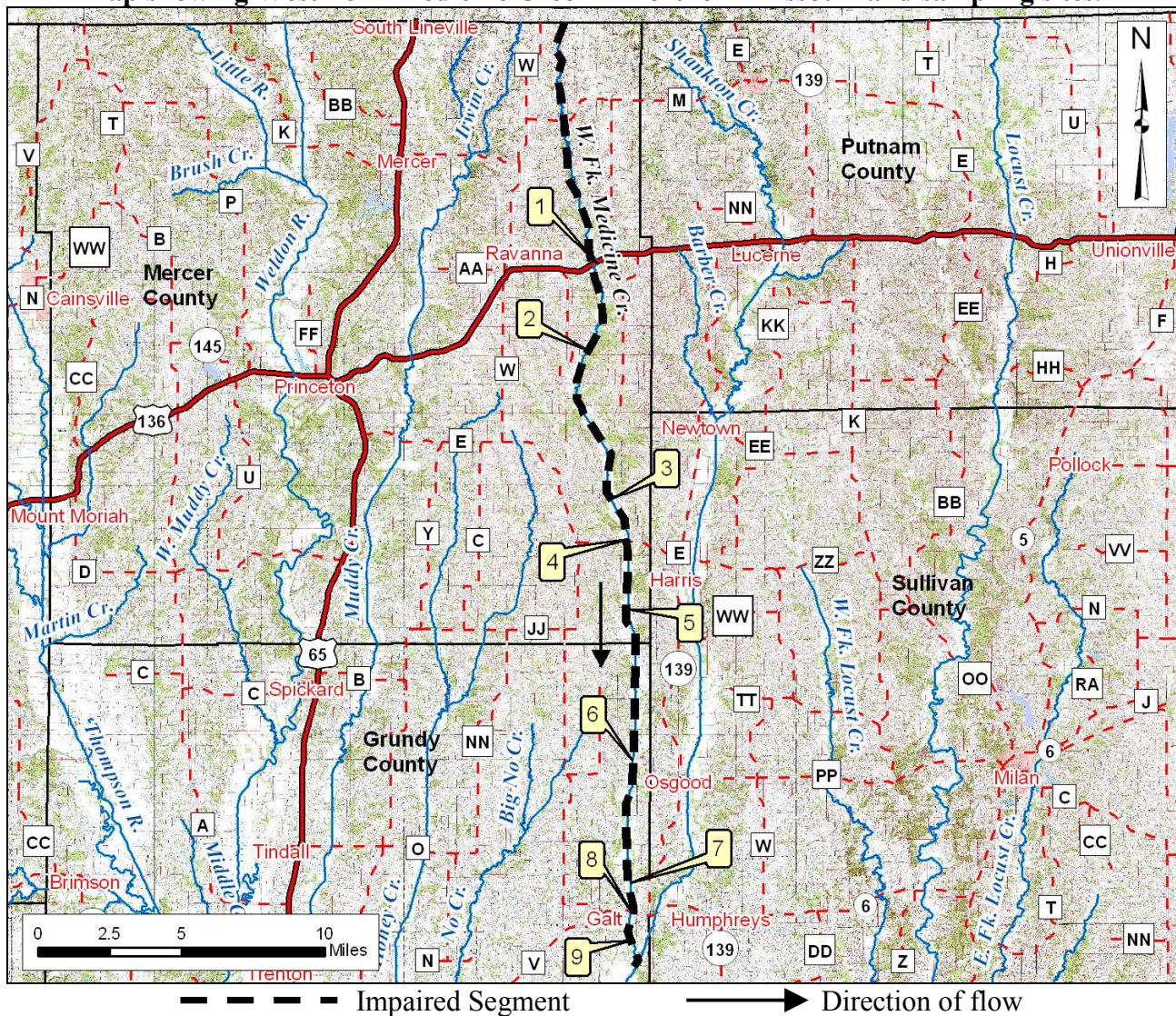


Figure 2

A map of West Fork Medicine Creek showing the sampling sites may be found on the last page.

Map showing West Fork Medicine Creek in northern Missouri and sampling sites.



Sampling Sites

- | | |
|---|---|
| 1 – W. Fk. Medicine Cr. above State Highway 136 | 6 – W. Fk. Medicine Cr. 1 mile W of Osgood |
| 2 – W. Fk. Medicine Cr. below Foothill Street | 7 – W. Fk. Medicine Cr. 1.5 miles N of Galt |
| 3 – W. Fk. Medicine Cr. below Intrepid Street | 8 – W. Fk. Medicine Cr. above State Highway 6 |
| 4 – W. Fk. Medicine Cr. at State Highway E * | 9 – W. Fk. Medicine Cr. above Galt WWTP |
| 5 – W. Fk. Medicine Cr. 2 miles SW of Harris | |

* All bacteria data was collected from Site 4

For more information call or write:

Missouri Department of Natural Resources, Water Protection Program
P.O. Box 176, Jefferson City, MO 65102-0176
1-800-361-4827 or 573-751-1300 office or 573-522-9920 fax
Program Home Page: www.dnr.mo.gov/env/wpp/index.html